

(21)

$$|2 - 2i| = \sqrt{8}$$

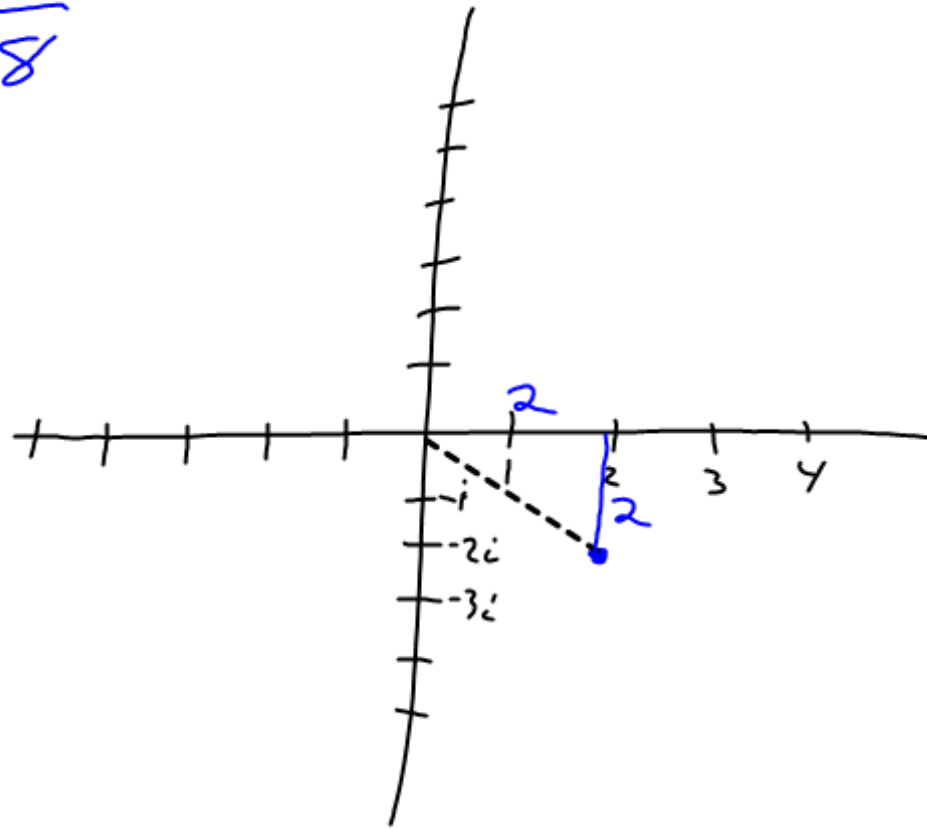
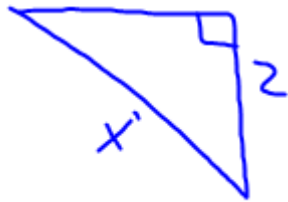
$$a^2 + b^2 = c^2$$

$$2^2 + 2^2 = x^2$$

$$4 + 4 = x^2$$

$$8 = x^2$$

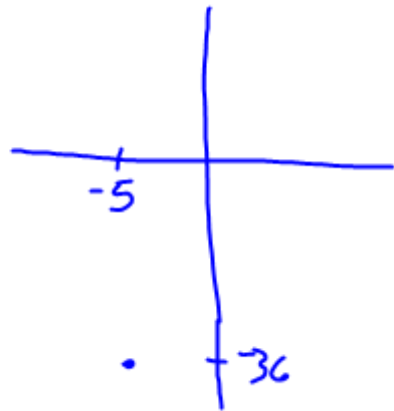
$$x = \sqrt{8}$$



$$y = (x + 5)^2 - 36$$

+5 down 36

Vertex $(-5, -36)$



$$x\text{-int } y=0$$

$$0 = (x + 5)^2 - 36$$

+36 +36

$$\sqrt{36} = \sqrt{(x + 5)^2}$$

$$\pm 6 = x + 5$$

-5 -5

$$x = 1, -11$$

$$x^2 + 2x - 6 = 0$$

$a=1 \quad b=2 \quad c=-6$

$$\textcircled{2} \quad x^2 + 2x = 6$$

$$\textcircled{3} \quad \frac{1}{2}(2) = 1^2 = 1$$

add to both sides

$$x^2 + 2x + 1 = 6 + 1$$

$$\textcircled{4} \quad (x + 1)^2 = 7$$

$$\textcircled{5} \quad (x + 1)^2 - 7 = 0$$

Completing the Square

① If a-term $\neq 1$, ^{divide every thing} by the a-term

② move c-term to the other side

③ Take $\frac{1}{2}$ b-term, square it
add it to both sides

④ Factor left side
 $(x + \frac{1}{2}b\text{-term})^2$
Simplify it side

⑤ Move c-term back over

⑥ mult. back by a-term

Complete the square

$$\textcircled{1} \quad x^2 - 12x + 5 = 0$$

$$\textcircled{2} \quad x^2 - 12x = -5$$

$$\textcircled{3} \quad \frac{1}{2}(-12) = \underline{-6} \rightarrow -6 \cdot -6 = 36$$

$$x^2 - 12x + 36 = -5 + 36$$

$$\textcircled{4} \quad (x - 6)^2 = 31$$

$$\textcircled{5} \quad \boxed{(x - 6)^2 - 31 = 0}$$

$$\textcircled{2} \quad x^2 + 4x - 4 = 0$$

$$x^2 + 4x = 4 \quad \textcircled{2}$$

$$\frac{1}{2}(4) = 2 \rightarrow 2^2 = 4 \quad \text{add both sides} \quad \textcircled{3}$$

$$x^2 + 4x + 4 = 4 + 4$$

$$(x + 2)^2 = 8 \quad \textcircled{4}$$

$$\boxed{(x + 2)^2 - 8 = 0}$$

$$\textcircled{3} \quad x^2 + 6x + 34 = 0$$

$$\textcircled{2} \quad x^2 + 6x = -34$$

$$\textcircled{3} \quad \frac{1}{2}(6) = 3 \rightarrow 3^2 = 9$$

$$x^2 + 6x + 9 = -34 + 9$$

$$\textcircled{4} \quad (x + 3)^2 = -25$$

$$\textcircled{5} \quad \boxed{(x + 3)^2 + 25 = 0}$$

only works

when a-term is 1

Example

$$2x^2 + 8x + 3 = 0$$

$$\textcircled{1} \frac{2x^2}{2} + \frac{8x}{2} + \frac{3}{2} = \frac{0}{2}$$

$$x^2 + 4x + 1.5 = 0$$

$$\textcircled{2} x^2 + 4x = -1.5$$

$$\textcircled{3} \frac{1}{2}(4) = 2 \rightarrow 2^2 = 4 \text{ add to both sides}$$

$$x^2 + 4x + 4 = -1.5 + 4$$

$$\textcircled{4} (x+2)^2 = 2.5$$

$$\textcircled{5} (x+2)^2 - 2.5 = 0$$

$$\textcircled{6} 2(x+2)^2 - 5 = 0$$

Easier

$$2x^2 + x - 6 = 0$$

$$x^2 + \frac{1}{2}x = 3$$

$$2(x + 0.5)^2 - 6.125$$

$$\checkmark 2\left(x + \frac{1}{4}\right)^2 - 6.125$$

Harder

$$\frac{3x^2 - 4x - 5}{3} = 0$$

$$x^2 - \frac{4}{3}x - \frac{5}{3} = 0$$

$$+\frac{5}{3} \quad +\frac{5}{3}$$

$$x^2 - \frac{4}{3}x = \frac{5}{3}$$

$$\frac{1}{2}\left(-\frac{4}{3}\right) = -\frac{2}{3} \rightarrow \left(-\frac{2}{3}\right)^2 = \frac{4}{9}$$

$$x^2 - \frac{4}{3}x + \frac{4}{9} = \frac{5}{3} + \frac{4}{9}$$

$$\left(x - \frac{2}{3}\right)^2 = \frac{15}{9} + \frac{4}{9}$$

$$\frac{19}{9} = 2\frac{1}{9}$$

$$\left(x - \frac{2}{3}\right)^2 - 2\frac{1}{9} = 0$$

$$3\left(x - \frac{2}{3}\right)^2 - 6\frac{3}{9} = 0$$

HW

Sect. 5.7

#1, 2, 13-33 (odd) - Show work